

**Testimony of
Ms. Joyce Dodd
Before the House Science Committee on
“The 2004 Presidential Awardees for Excellence in Mathematics and Science Teaching”
April 14, 2005**

It is indeed an honor to address this committee and a humbling experience to speak on behalf of my colleagues today. The single most important step that the federal government should take to improve math and science education in this country is to improve **pre-service** and **in-service** training for teachers of mathematics in elementary and middle schools. When math teachers in these classrooms do not have a strong background in mathematics, that deficit impacts both the content and the process (the “what” and the “how”) of their teaching.

I am one of these teachers who found herself teaching mathematics in a middle school classroom using an elementary teaching certificate. My job in home economics was phased out due to budget cuts; I was determined to become the best math teacher that I could become. Taking stock of the situation, I knew that I was a good teacher. I called the district math consultant, who was a former colleague, to seek guidance as to how to “fast track” my own math education. She gave me two pieces of advice, which I followed.

The **first piece of advice** was to **join the National Council of Teachers of Mathematics**. This organization produces high quality teaching materials and publishes a magazine that connects math teachers with other math teachers. It is **the** organization that helped change the direction of the teaching of mathematics in this country. Mathematics is a science, and like any other science, it is growing and evolving.

The math content that I teach needs to prepare my students for life in the future. The shift in math content is misunderstood by many people, including math educators. Math is so much more than adding $2 + 2$ or dividing a 3 digit number by a 2 digit number. These operations can be easily done with a calculator. The key to using this technology, which came be purchased at Wal-Mart for under \$10, is to know if the resulting answer is reasonable, i.e., “Does it make sense?”

At this point, I would like to briefly explain the **mathematics standards** that, I believe, should be pervasive in elementary, middle and high schools throughout this country. Five categories form the **content area** of mathematics: numbers and operations, algebra, geometry, measurement and data analysis, and statistics. What makes these standards “come alive” and give meaning to students is the incorporation of the **process standards**. These standards include problem solving, representation, communication, connections, and reasoning and proofs.

In order to incorporate the process standards students need to be “actively engaged” in math. **Active learning** has students solving problems and discussing solutions. Students are able to justify their work to one another and to the teacher.

I challenge my students who want to become better at math to do what the NCTM logo suggests, “Do Math”. It is my job as their teacher to create situations where this happens.

NCTM also sponsors courses for teachers through various grants. I attended one such course taught in our district, T³. This acronym stands for teachers teaching technology. This course enabled me to become proficient with a graphing calculator. I would suggest that

NSF could use this as a model for funding courses for teachers. The teacher that attends these courses receives free technology—in my case a free graphing calculator—that can be incorporated in her classroom. What an incentive!

The **second piece of advice** was to take as many courses in mathematics as I could. I was fortunate to be in a district that had an initiative to improve the content knowledge of mathematics teachers in the middle school who lacked a degree in secondary mathematics education. Not all teachers work in a district that gives this much foresight and financial support to mathematics education. This is where the federal government could sponsor teacher education courses.

These were especially valuable courses because the courses were taught with the use of “hands on” lessons that integrated technology in each lesson. The college professor in these classes was modelling the way that I should develop my own lessons. These courses also made connections within the field of mathematics. I could “see” the way math should be taught. My college professor was the model that I could duplicate in my classes. I think it is extremely important to have teachers view other teachers that are actively engaging students in learning. We all tend to teach the way we were taught. The implication here is that teacher preparation classes as well as teacher in-services should employ the teaching practices we desire teachers to use in their classrooms.

In closing, I would like to say that the knowledge for improving math education in this country already exists. However, there is a gap in the **dispersal of this information**. Programs that foster “best teaching” practices will have children actively engaged in mathematics. The federal government could be on the forefront of this dispersal of information by sponsoring courses for the teachers of mathematics. The rewards for participation in these courses could take the form of stipends, graduate credit or free equipment for the classroom. A single teacher of mathematics will influence an astonishing number of students. The profit from this investment would be astronomical!